

# **Geology 12**

## **FINAL EXAM PREP**

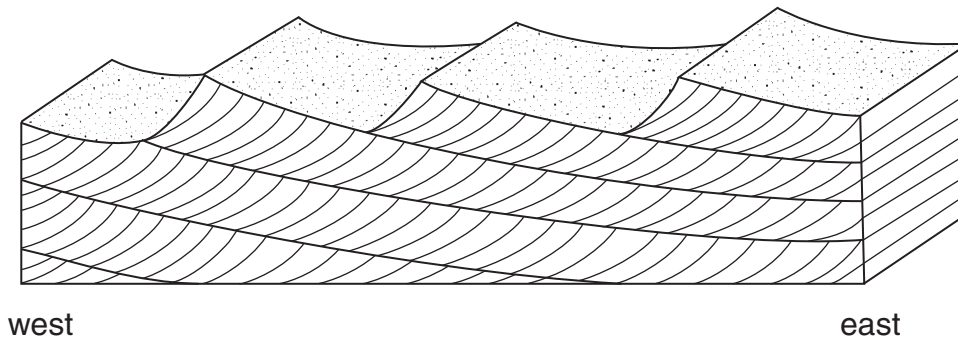
### **Possible Written Response Exam Questions**

**Use this study guide to prepare  
for the written response portion  
of the final exam.**

Name \_\_\_\_\_

## FINAL EXAM - POSSIBLE WRITTEN RESPONSE QUESTIONS

Use the following diagram of ripple marks and cross-bedding to answer question 1.



1. Describe how this structure might have formed. Include direction of flow in your answer. (2 marks)

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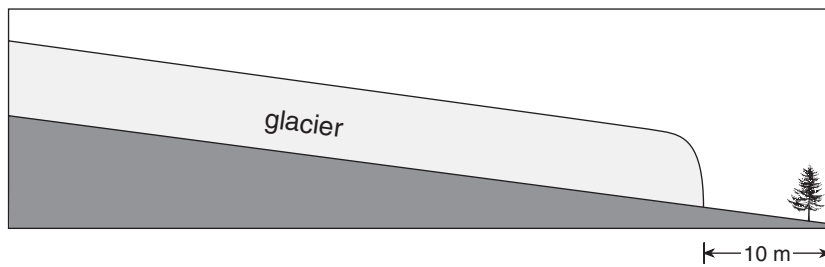
### KEY

Fluid transporting sand-sized sediment travelled from east to west.  
Sediment was transported up the gentle slope of the first ripple, then  
deposited over and down the slip face in a tilted layer.

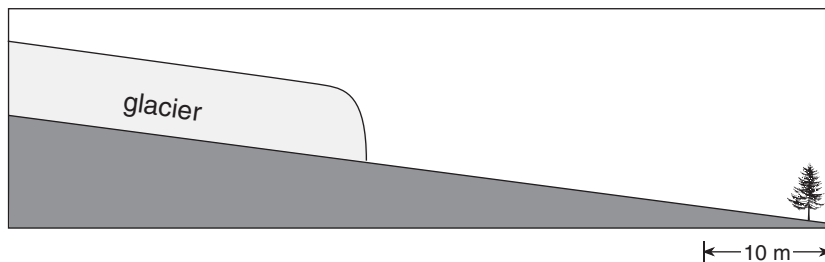
} ← 2 marks

Use the following diagrams to answer question 2.

August 2004

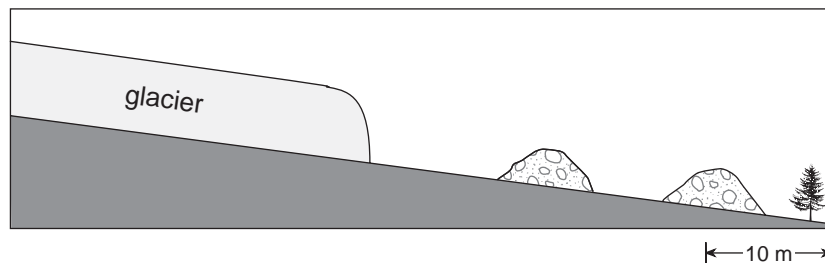


August 2006



2. Helm Glacier on Mt. Garibaldi has been retreating since the summer of 2004, and leaving a recessional moraine every winter. On the August 2006 diagram above, draw and label (with date) recessional moraines that would likely have formed during the winters of 2004-2005 and 2005-2006. (2 marks)

### KEY



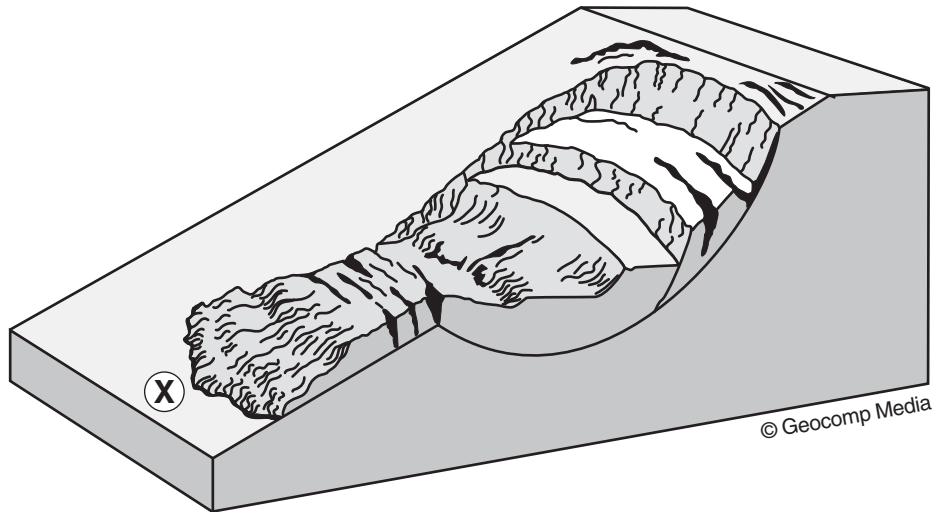
For 2 marks:

Appropriate shape for recessional (end) moraines

Moraines separated from toe of glacier

2004-2005 moraine further downslope than 2005-2006 moraines

Use the diagram of a rotational slump to answer question 3.



3. The slope shown above has become very unstable and is threatening a highway just below **X**. Describe **two** methods that would be used to stabilize the slope and safeguard the highway. (2 marks)

Method 1: \_\_\_\_\_

\_\_\_\_\_

Method 2: \_\_\_\_\_

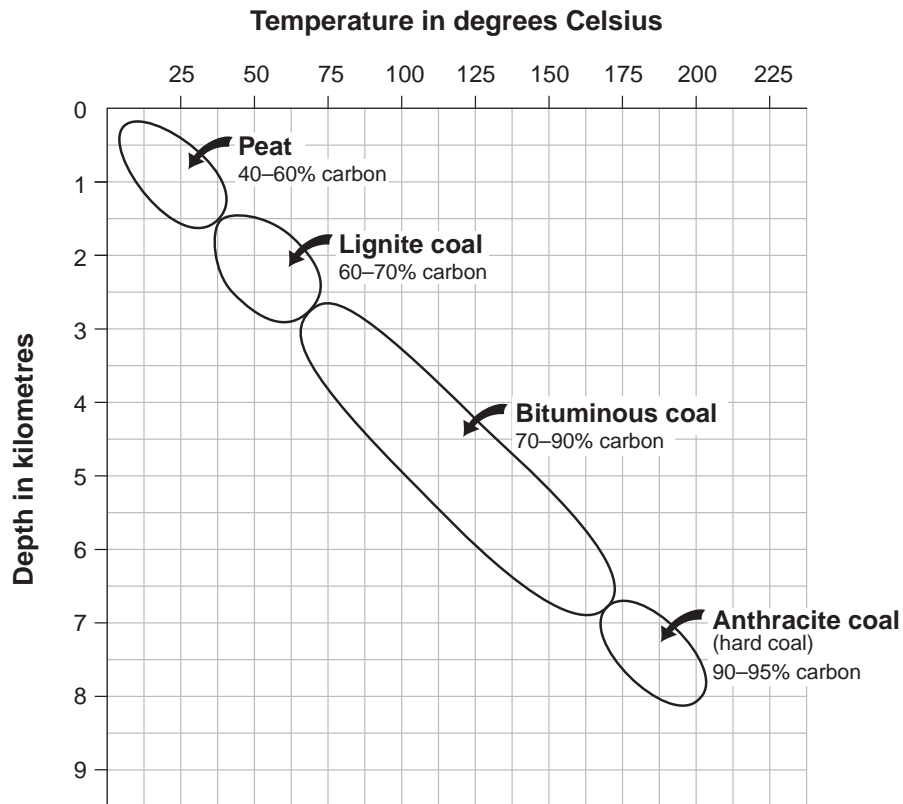
\_\_\_\_\_

## KEY

Any **two** methods for **1 mark each**:

- Remove water – drain the slope using perforated pipes.
- Divert water away – build drainage channels to divert water away from this part of the slope.
- Plant trees and vegetation that will help to hold the slope sediments and remove water.
- Build a retaining wall at the base of the slump.
- Remove a portion of the upper part of the slump in order to reduce weight.

Use the following graph which shows relationships between temperature, depth, and types of coal, to answer question 4.



4. a) Describe a type of environment where a potential coal deposit could accumulate on the earth's surface and the type of material that would accumulate to eventually become coal.

(2 marks)

- b) According to the graph, at what temperature and depth would lignite change to bituminous coal?

(1 mark)

- c) Choose **one** type of coal and describe a use for it.

(1 mark)

- d) Why is anthracite (hard coal) often found in association with slate rather than shale or mudstone?

(1 mark)

## KEY

4. a) Describe a type of environment where a potential coal deposit could accumulate on the earth's surface and the type of material that would accumulate to eventually become coal. (2 marks)

Type of environment: **usually a swamp, marsh or delta where there is abundant plant growth and decomposition.** ← 1 mark

Type of material: **plant material, vegetation** ← 1 mark

**organic** ←  $\frac{1}{2}$  mark

**previously living material** ←  $\frac{1}{2}$  mark

- b) According to the graph, at what temperature and depth would lignite change to bituminous coal? (1 mark)

Temperature: **approximately  $> 62^{\circ}\text{C}$   
 $< 75^{\circ}\text{C}$**  ←  $\frac{1}{2}$  mark

Depth:  **$2.3 - 3.5\text{ km}$   
 $> 2.5\text{ km}$   
 $< 3\text{ km}$**  ←  $\frac{1}{2}$  mark

- c) Choose **one** type of coal and describe a use for it. (1 mark)

Any **one** for **1 mark**:

***Peat*: used for heating, power generation, soil enhancer, absorbent for liquids**

***Lignite*: used for heating, power generation, source for organic chemicals**

***Bituminous*: used for heating, power generation, source for organic chemicals, coking in steel manufacture**

***Anthracite*: heating, power generation**

- d) Why is anthracite (hard coal) often found in association with slate rather than shale or mudstone? (1 mark)

**Anthracite (hard coal) forms at the highest temperature and pressure of all the coals and is in fact metamorphic. At this temperature and pressure, the sedimentary rock shale or mudstone will have been metamorphosed to slate because of the higher temperature and pressure.**

} ← 1 mark

5. Complete the table below to show how the earth's resources of coal and gravel are formed and used. **(2 marks)**

Earth resource	How it formed	One use
<i>Example:</i> <b>Rock salt (halite)</b>	<i>evaporation of sea water</i>	<i>road salt</i>
<b>Coal</b>		
<b>Gravel</b>		

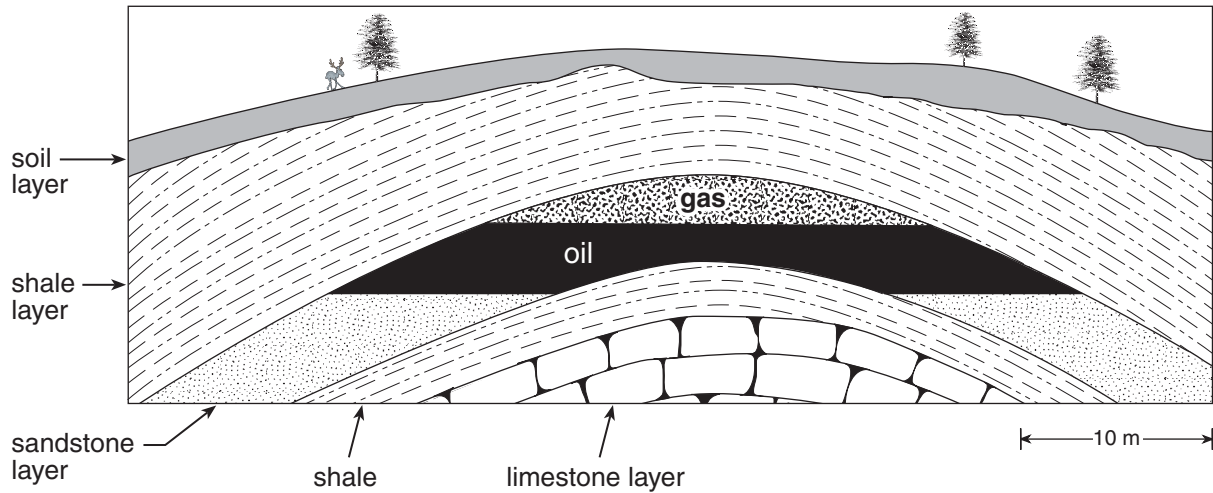
## KEY

5. Complete the table below to show how the earth's resources of coal and gravel are formed and used. **(2 marks)**

$\frac{1}{2}$  mark for each correct answer. Total 2 marks

Earth resource	How it formed	One use
<i>Example:</i> <b>Rock salt (halite)</b>	<i>evaporation of sea water</i>	<i>road salt</i>
<b>Coal</b>	<ul style="list-style-type: none"> <li>• burial of woody material from swamps/forest</li> </ul>	<ul style="list-style-type: none"> <li>• generates electricity</li> <li>• petrochemicals</li> <li>• steel production</li> </ul>
<b>Gravel</b>	<ul style="list-style-type: none"> <li>• erosion, transport and deposition of sediments</li> <li>• glacial deposition</li> </ul>	<ul style="list-style-type: none"> <li>• construction</li> <li>• concrete</li> </ul>

Use the following diagram of an oil and gas deposit to answer question 6



6. a) Describe how the oil and gas might have formed. (2 marks)

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- b) Describe **two** characteristics of the rock materials that enable the oil and gas to accumulate in this particular location. (2 marks)

Characteristic 1: \_\_\_\_\_

Characteristic 2: \_\_\_\_\_

## KEY

6. a) Any one for 2 marks:

- marine microorganisms in oceans die
- marine microorganisms get buried
- chemical reactions cause creation of hydrocarbons
- hydrocarbons accumulate in traps

6. b) Any two for 1 mark each:

- the reservoir rock must be porous
- the cap rock must be impermeable
- the reservoir must be permeable
- appropriate structure (anticline)



**Use the following description of a mineral to answer question 7.**

*“A valuable mineral X forms mainly in hydrothermal veins, often associated with quartz and sulphide minerals. It is often found in placer deposits of unconsolidated sand, as well as sandstone and conglomerate. It may be confused with pyrite and chalcopyrite because of its similar appearance, but is easily distinguished on the basis of its higher density.”*

7. a) i) What is mineral X?

**(1 mark)**

\_\_\_\_\_

ii) Describe another test and its results that would distinguish mineral X from pyrite and chalcopyrite.

**(2 marks)**

Test	Result for Mineral X	Result for Pyrite	Result for Chalcopyrite

b) Describe how a placer deposit forms.

**(2 marks)**

\_\_\_\_\_  
\_\_\_\_\_

c) Chalcopyrite is mined so that copper can be extracted from it. Describe one use of copper.

**(1 mark)**

\_\_\_\_\_  
\_\_\_\_\_

## KEY

7. a) What is mineral X?

(1 mark)

gold ← 1 mark

**Note:** If gold is not chosen, marks can still be awarded for following questions.

$\frac{1}{2}$  mark for each box. Total 2 marks.

(2 marks)

Test	Result for Mineral X	Result for Pyrite	Result for Chalcopyrite
1. Streak	yellow	greenish-black	black
2. Form	flakes, grain, massive	cubic dodecahedral	tetrahedral
3. Hardness	2.5 – 3.0	6.0 – 6.5	3.5 – 4.0

b) Describe how a placer deposit forms.

(2 marks)

Sediments weathered from rock are transported. Dense grains are harder to transport and tend to be deposited more easily than lighter, silicate minerals. Grains of gold are thus often found in sand or gravel deposits. Alluvial placer deposits are found most often where stream velocity drops.

} ← 2 marks

c) Chalcopyrite is mined so that copper can be extracted from it. Describe one use of copper.

(1 mark)

Any one for 1 mark:

- water pipes
- electrical wiring
- cooking pots
- component of alloys bronze and brass
- copper sulphate is used to control moss

*For question 8, refer to the following in the Data Booklet.*  
**Properties of Common and Important Minerals**

8. Describe **two** properties that would help distinguish between chalcopyrite and pyrite.  
(2 marks)

Property	Description for chalcopyrite	Description for pyrite
<i>Property 1:</i>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<i>Property 2:</i>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>

9. Name a resource found in British Columbia that has resulted from glacier or river processes.  
Give a specific use for that resource.  
(2 marks)

Name of resource: \_\_\_\_\_

Description of use: \_\_\_\_\_

\_\_\_\_\_

## KEY

8. Describe **two** properties that would help distinguish between chalcopyrite and pyrite. **(2 marks)**

Any **two** for **1 mark each**:

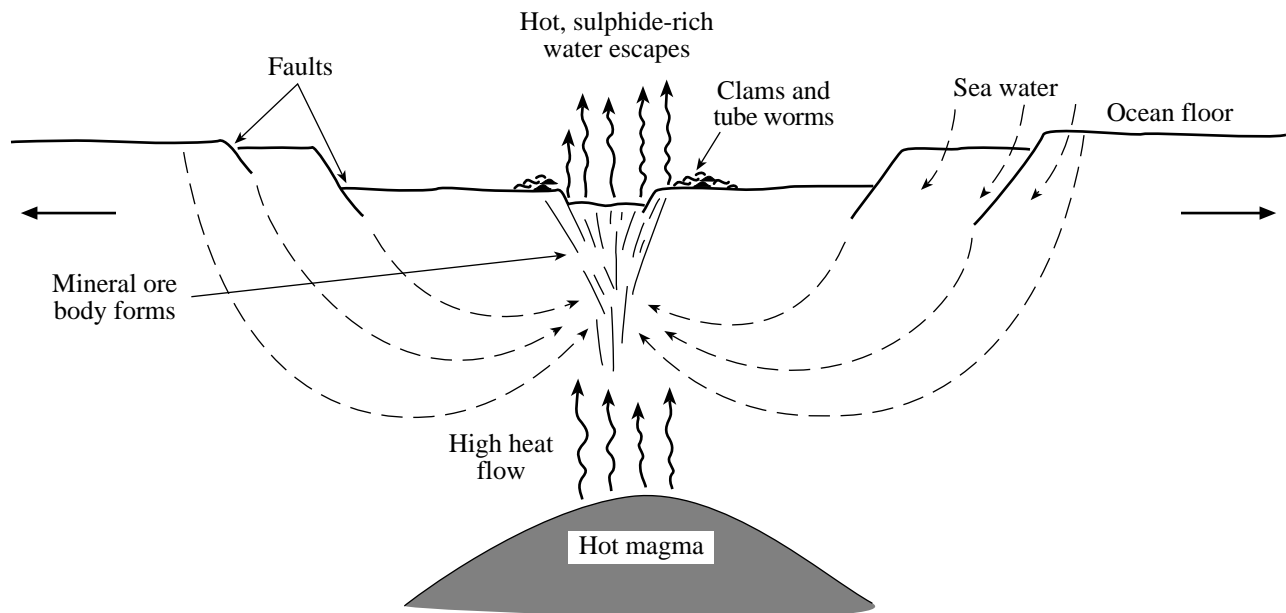
Property	Description for chalcopyrite	Description for pyrite
<i>Property 1:</i>	<b>hardness between 3.5–4</b>	<b>hardness between 6–6.5</b>
<i>Property 2:</i>	<b>has a golden-brassy yellow colour</b>	<b>has a brassy yellow colour</b>
<i>Property 3:</i>	<b>tetrahedral crystals</b>	<b>cubic crystals</b>
<i>Property 4:</i>	<b>has a specific gravity of 4.2</b>	<b>has a specific gravity of 5.0</b>
<i>Property 5:</i>	<b>black streak</b>	<b>greenish black streak</b>

9. Name a resource found in British Columbia that has resulted from glacier or river processes.  
Give a specific use for that resource. **(2 marks)**

Any **one** resource for **1 mark**; any **one** use for **1 mark**:

Resource	Use
<b>sand</b>	<ul style="list-style-type: none"> <li>• <b>cement</b></li> <li>• <b>road construction</b></li> <li>• <b>pre-loading for foundations</b></li> </ul>
<b>gravel</b>	<ul style="list-style-type: none"> <li>• <b>concrete</b></li> <li>• <b>construction</b></li> </ul>
<b>placer deposits</b> (Au, Pt, Cr, diamonds, etc)	<ul style="list-style-type: none"> <li>• <b>jewellery</b></li> <li>• <b>electronics</b></li> <li>• <b>art</b></li> </ul>
<b>glacial till</b>	<ul style="list-style-type: none"> <li>• <b>earth fill</b></li> <li>• <b>dam construction</b></li> </ul>
<b>silt and clay</b>	<ul style="list-style-type: none"> <li>• <b>pottery</b></li> <li>• <b>bricks</b></li> <li>• <b>impermeable base for landfill sites or ponds</b></li> </ul>
<b>water</b>	<ul style="list-style-type: none"> <li>• <b>agriculture</b></li> <li>• <b>power</b></li> <li>• <b>sanitation</b></li> <li>• <b>drinking</b></li> </ul>

Use the following diagram of a submarine “black smoker” hydrothermal vent to answer question 10.



10. a) New, large mineral deposits of copper, zinc, silver, etc. are forming today on the sea floor at the sites of hydrothermal vents. Referring to the diagram above, describe why the vents are usually located in an oceanic rift valley. **(1 mark)**

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- b) Referring to the diagram above, describe a possible source for the metals in the hydrothermal solution. **(1 mark)**

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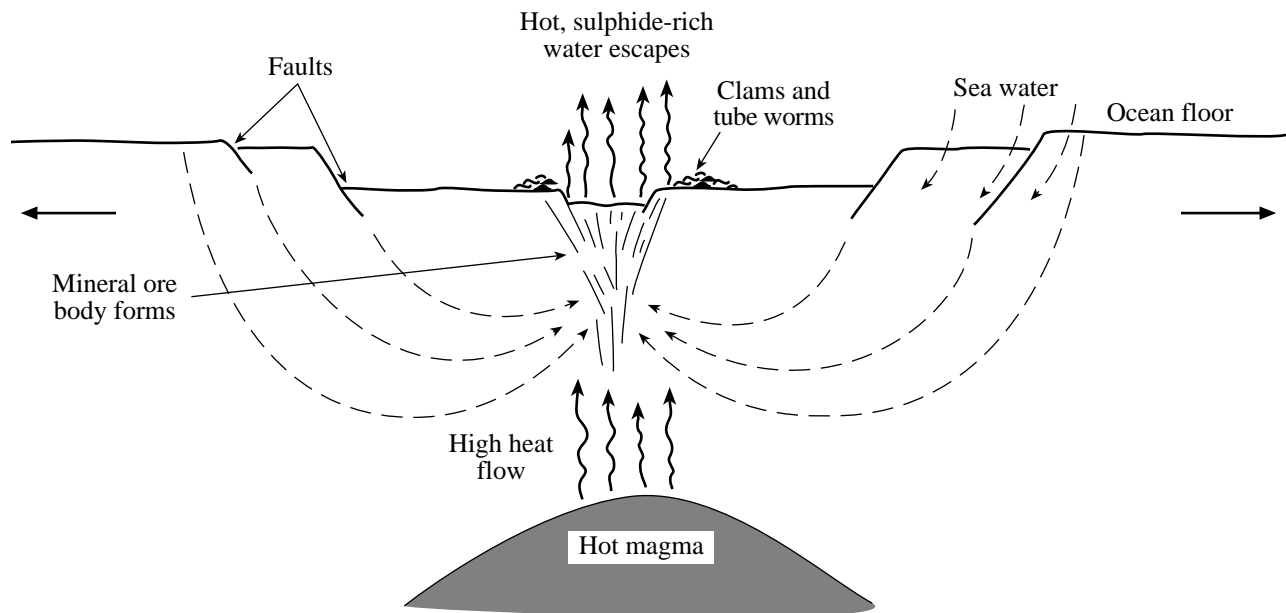
- c) Explain why the ore minerals are often deposited close to the hydrothermal vent. **(1 mark)**

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## KEY



10. a) New, large mineral deposits of copper, zinc, silver, etc. are forming today on the sea floor at the sites of hydrothermal vents. Referring to the diagram above, describe why the vents are usually located in an oceanic rift valley. (1 mark)

**Sea floor spreading occurs at oceanic rift valleys. This is a volcanic area, and therefore there is an abundance of heat available to drive the water convection.**

**The rock here is heavily fractured and faulted, providing channel ways for the water.**

**Note: Students should mention heat and fracture.**

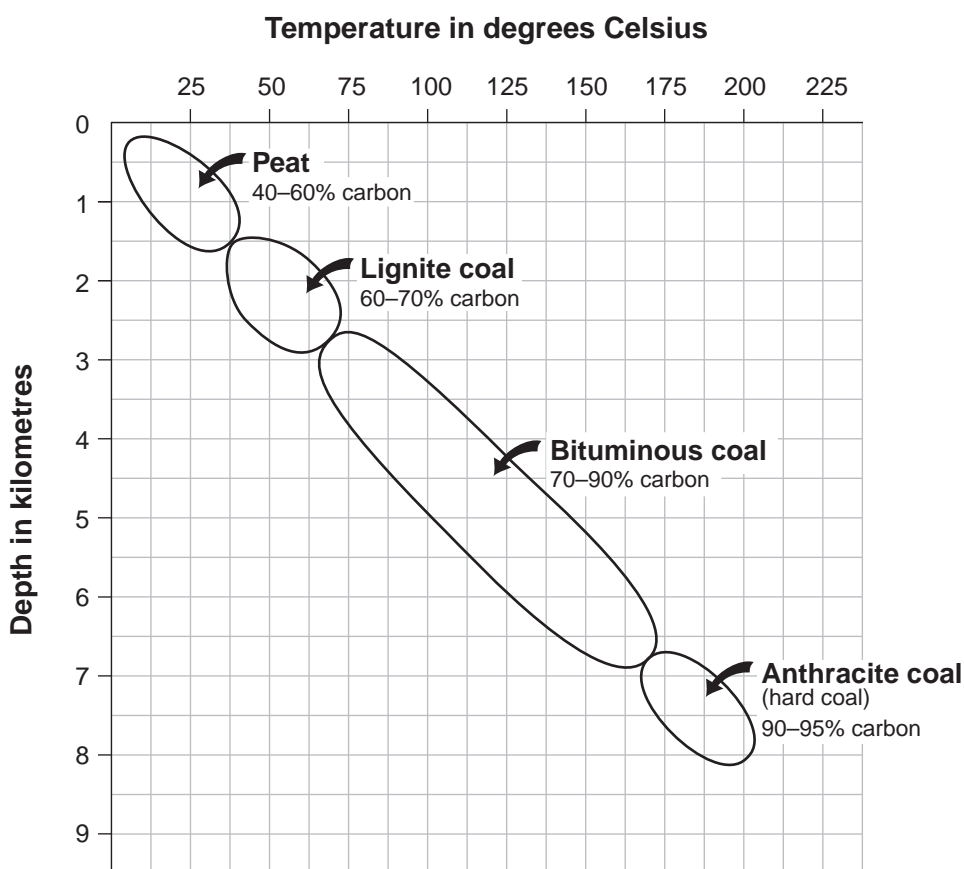
- b) Referring to the diagram above, describe a possible source for the metals in the hydrothermal solution. (1 mark)

**Source: The rocks of the ocean crust through which the hot water travels. (1 mark)**  
**From magma fluids. ( $\frac{1}{2}$  mark)**

- c) Explain why the ore minerals are often deposited close to the hydrothermal vent. (1 mark)

**Ore minerals in the hot solution precipitate quickly on contact with cool sea water.**  
**Solubility changes when they enter cold water.**

Use the following graph which shows relationships between temperature, depth, and types of coal, to answer question 11.



11. a) Describe a type of environment where a potential coal deposit could accumulate on the earth's surface and the type of material that would accumulate to eventually become coal. **(2 marks)**

Type of environment: \_\_\_\_\_

\_\_\_\_\_

Type of material: \_\_\_\_\_

\_\_\_\_\_

- b) According to the graph, at what temperature and depth would lignite change to bituminous coal? **(1 mark)**

Temperature: \_\_\_\_\_ Depth: \_\_\_\_\_

- c) Choose **one** type of coal and describe a use for it. **(1 mark)**

\_\_\_\_\_

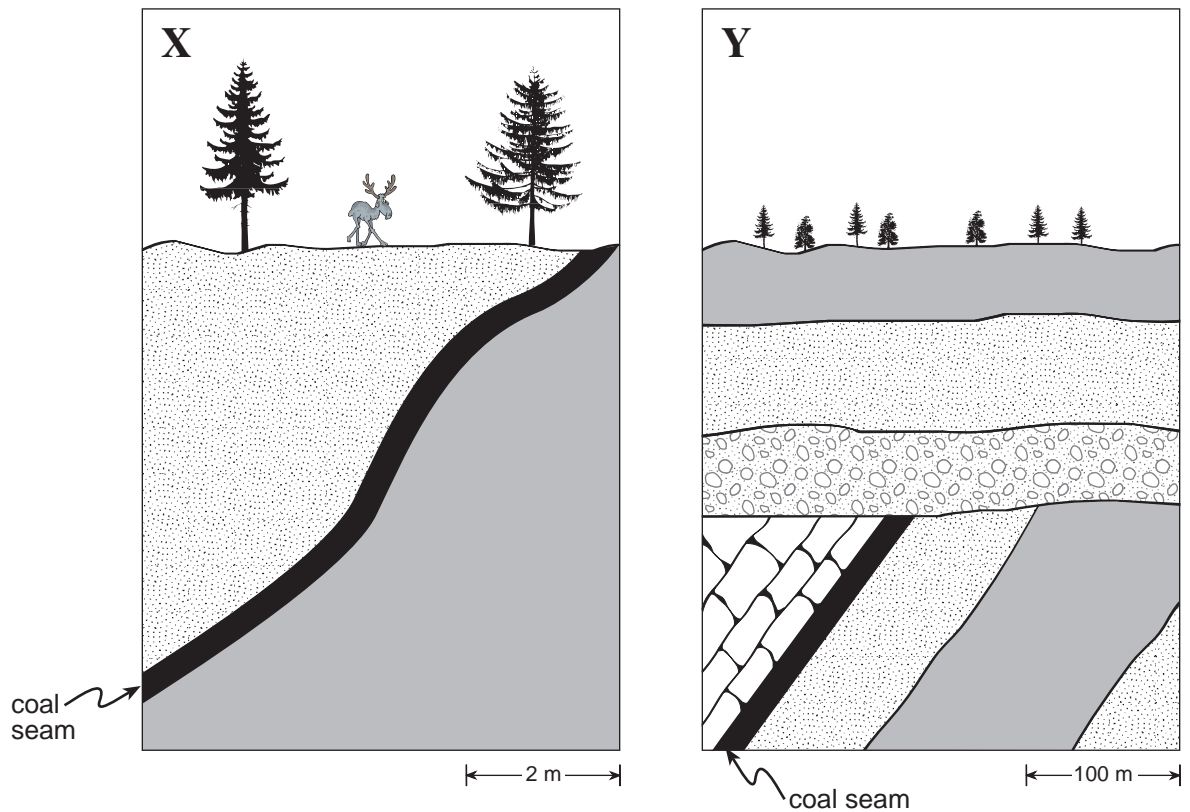
\_\_\_\_\_

- d) Why is anthracite (hard coal) often found in association with slate rather than shale or mudstone? (1 mark)

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Use the following cross section diagrams of coal deposits to answer question 11e).  
Note the different scales of the cross sections.



- e) The two coal deposits **X** and **Y** were discovered in British Columbia, however neither of them will be mined at this time.
- i) Describe **any** geological or economic reason why deposit **X** will not be mined. (1 mark)

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- ii) Describe a different geological or economic reason why deposit **Y** will not be mined. (1 mark)

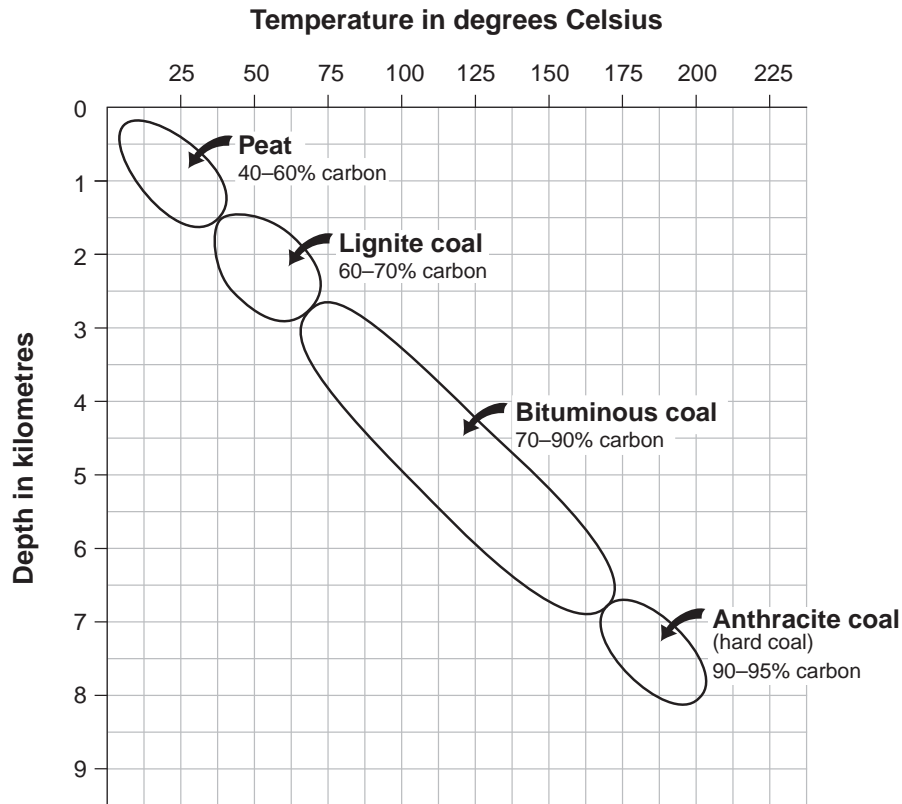
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# KEY

Use the following graph which shows relationships between temperature, depth, and types of coal, to answer question 11.



11. a) Describe a type of environment where a potential coal deposit could accumulate on the earth's surface and the type of material that would accumulate to eventually become coal.

(2 marks)

Type of environment: **usually a swamp, marsh or delta where there is abundant plant growth and decomposition.** ← 1 mark

Type of material: **plant material, vegetation** ← 1 mark

**organic** ←  $\frac{1}{2}$  mark

**previously living material** ←  $\frac{1}{2}$  mark

- b) According to the graph, at what temperature and depth would lignite change to bituminous coal?

(1 mark)

Temperature: **approximately > 62° C** ←  $\frac{1}{2}$  mark  
**< 75° C**

Depth: **2.3 – 3.5 km** ←  $\frac{1}{2}$  mark  
**> 2.5 km**  
**< 3 km**

c) Choose **one** type of coal and describe a use for it.

**(1 mark)**

Any **one** for **1 mark**:

***Peat:*** used for heating, power generation, soil enhancer, absorbent for liquids

***Lignite:*** used for heating, power generation, source for organic chemicals

***Bituminous:*** used for heating, power generation, source for organic chemicals, coking in steel manufacture

***Anthracite:*** heating, power generation

d) Why is anthracite (hard coal) often found in association with slate rather than shale or mudstone?

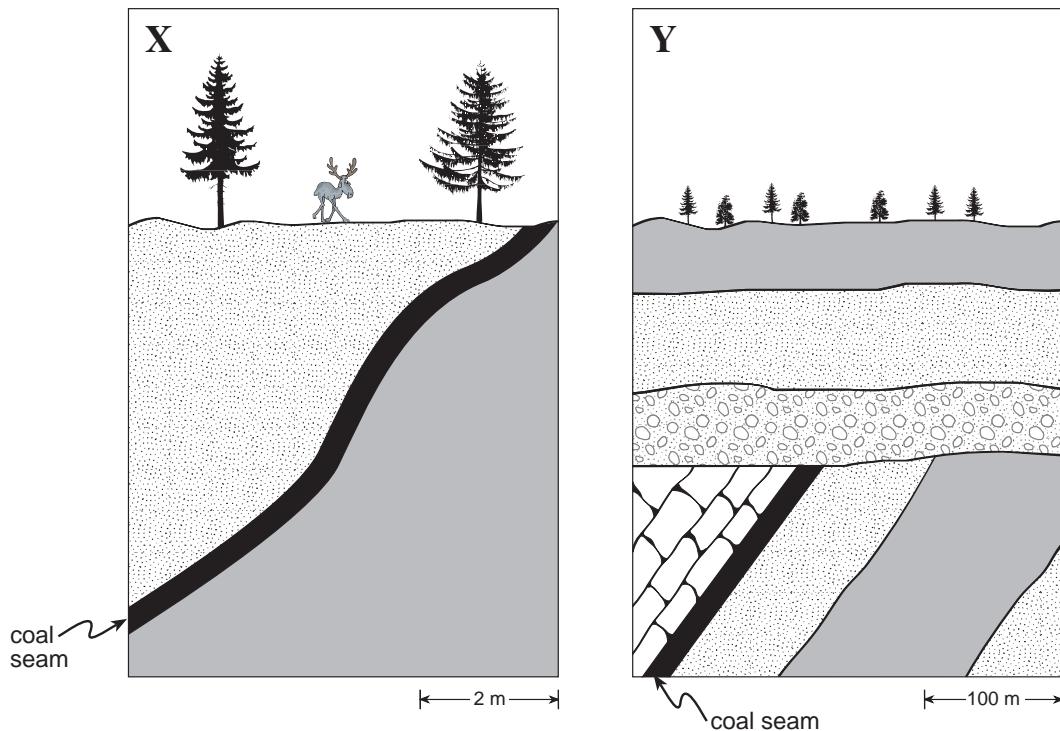
**(1 mark)**

**Anthracite (hard coal) forms at the highest temperature and pressure of all the coals and is in fact metamorphic. At this temperature and pressure, the sedimentary rock shale or mudstone will have been metamorphosed to slate because of the higher temperature and pressure.**

} ← **1 mark**

*continued next page...*

Use the following cross section diagrams of coal deposits to answer question 11e).  
Note the different scales of the cross sections.



e) The two coal deposits X and Y were discovered in British Columbia, however neither of them will be mined at this time.

i) Describe **any** geological or economic reason why deposit X will not be mined. (1 mark)

Any one for 1 mark:

- The coal seam is too thin (about 50 cm) and would be too difficult to extract using machinery.
- The coal seam is too thin and too much rock would have to be removed for every ton of coal obtained.
- The price of coal is too low to make it worthwhile mining this deposit.
- Dip of the seam makes it too deep.
- Environmental reason connected to economical or geological reasons.

ii) Describe a different geological or economic reason why deposit Y will not be mined.

(1 mark)

Any one for 1 mark:

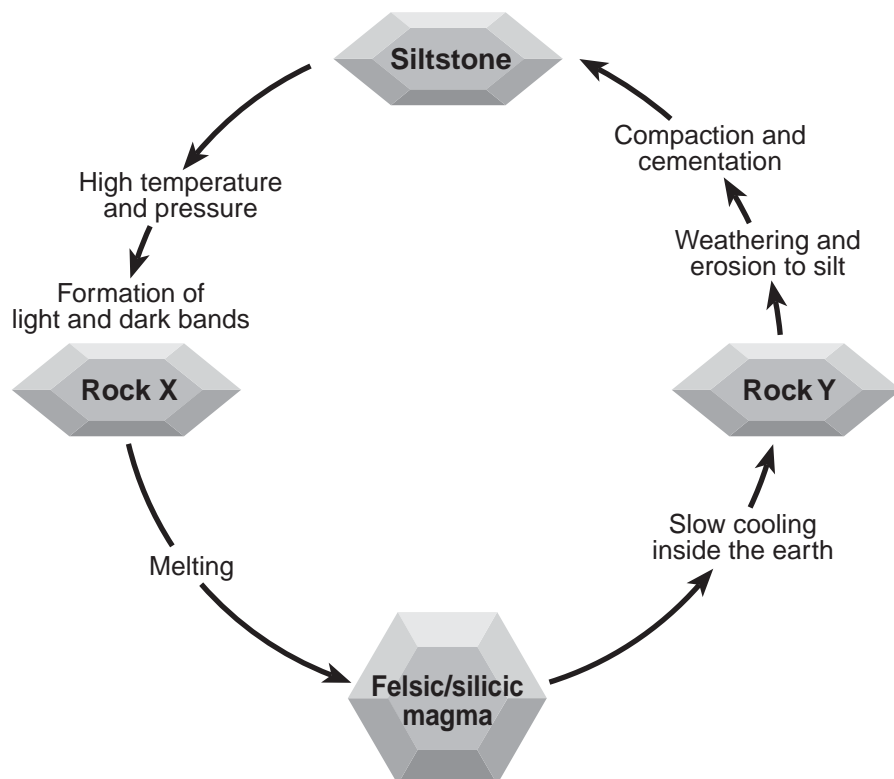
- The coal seam is too deep. It would be difficult to extract the coal using cheaper open pit methods.
- The coal seam is too deep and too much rock would have to be removed for every ton of coal obtained.
- The price of coal is too low to make it worthwhile mining this deposit.
- Dip of the seam makes it too deep.
- Any other good geological or economic reason.

**INSTRUCTIONS:** Answer each question in the space provided. You may not need to use all of the space given.

**REFERENCE  
DATA BOOKLET**

*For question 12, refer to the diagram below and the following in the Data Booklet.*

**Percentage of Minerals in Igneous Rocks**



12. a) What type of rocks are rocks **X** and **Y** shown in the diagram above? **(1 mark)**

Rock X: \_\_\_\_\_ Rock Y: \_\_\_\_\_

- b) Describe a plate tectonic situation that would cause the high-grade metamorphism of the siltstone. **(1 mark)**

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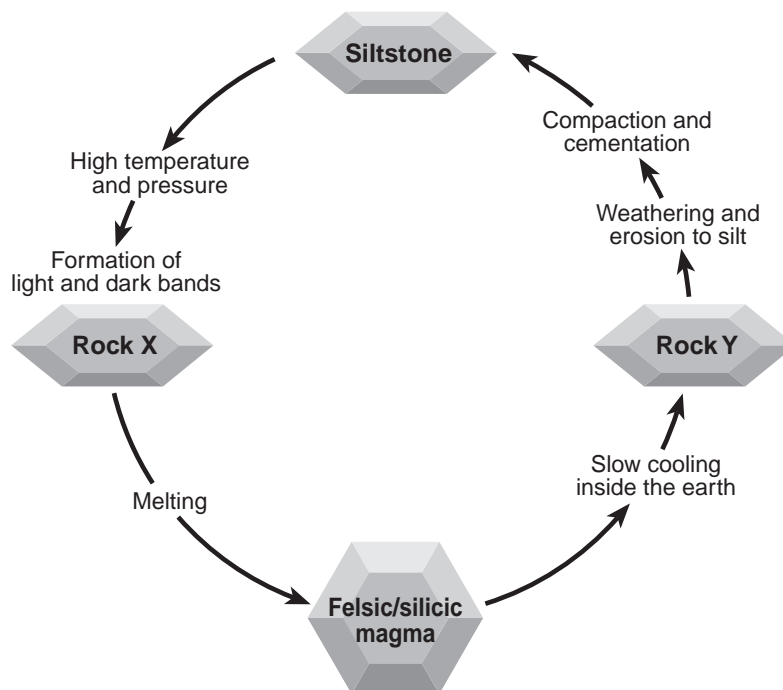
# KEY

**INSTRUCTIONS:** Answer each question in the space provided. You may not need to use all of the space given.

## REFERENCE DATA BOOKLET

*For question 12, refer to the diagram below and the following in the Data Booklet.*

### Percentage of Minerals in Igneous Rocks



12. a) What type of rocks are rocks **X** and **Y** shown in the diagram above? (1 mark)

Rock X: **gneiss/schist** ←  $\frac{1}{2}$  mark  
**OR**  
**metamorphic or recrystallized**

Rock Y: **granite/diorite/syenite** ←  $\frac{1}{2}$  mark  
**OR**  
**igneous, plutonic, intrusive**

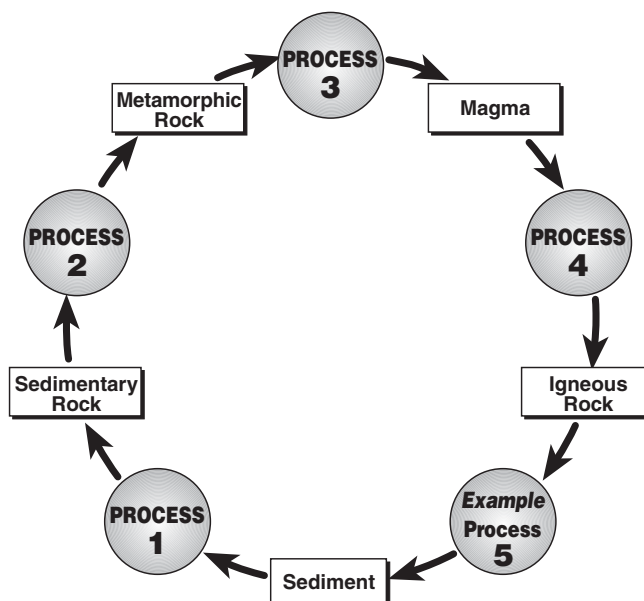
b) Describe a plate tectonic situation that would cause the high-grade metamorphism of the siltstone. (1 mark)

Any **one** for **1 mark**:

- **Large scale metamorphism, characteristic of mountain building.**
- **Deep burial, as in accretionary prism.**
- **Tectonic settings, i.e. converging boundaries, subduction zones.**

**INSTRUCTIONS:** Answer each question in the space provided. You may not need to use all of the space given.

Use the following partial, simplified, rock cycle diagram to answer question 13.



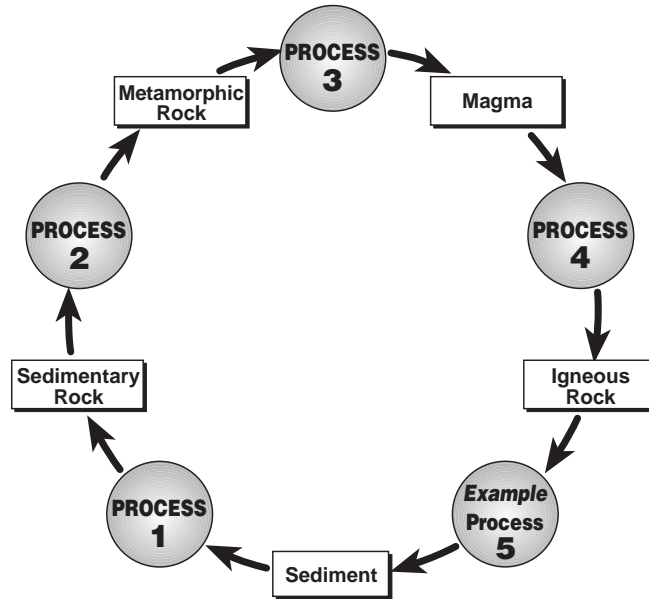
13. Choose any **two** processes from the diagram above. For each process, describe the process and its probable plate tectonic location. An example is given. **(4 marks)**

Process #	Description of Process	Plate Tectonic Location
Example: Process 5	<i><b>Igneous rocks</b> in volcanic mountains are weathered and eroded to become <b>sediments</b>.</i>	<i>Volcanic mountain range at converging plates.</i>

## KEY

**INSTRUCTIONS:** Answer each question in the space provided. You may not need to use all of the space given.

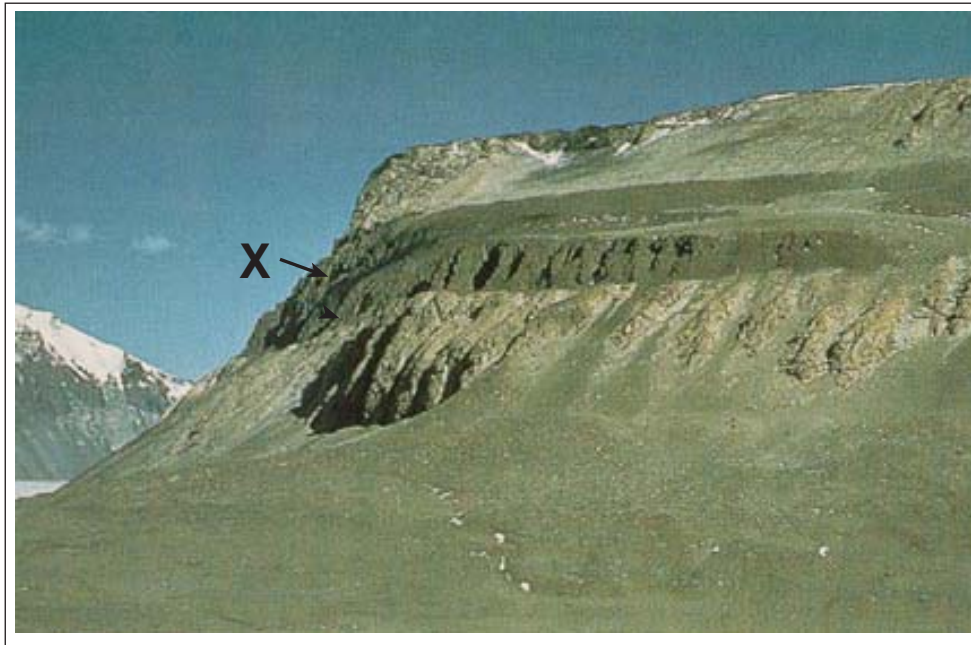
Use the following partial, simplified, rock cycle diagram to answer question 13.



13. Choose any **two** processes from the diagram above. For each process, describe the process and its probable plate tectonic location. An example is given. (4 marks)

Process #	Description of Process	Plate Tectonic Location
<i>Example: Process 5</i>	<i><b>Igneous rocks</b> in volcanic mountains are weathered and eroded to become <b>sediments</b>.</i>	<i>Volcanic mountain range at converging plates.</i>
1	Sediment is carried to the ocean by streams and deposited in layers that are then lithified to become sedimentary rock.	Ocean trenches at subduction zones.
2	Sedimentary rocks are heated near plutons or under extreme pressure in collision zones, which causes them to become metamorphic.	Near plutons or tectonic collision zones.
3	Rocks are melted at depth to become magma.	Subducting plate at a depth of 200–300 km.
4	Magma cools as it exits the earth, becoming an igneous rock.	Volcano or spreading ridge.

Use the following photograph of an igneous layer to answer question 14.



© GSC

14. Describe **two** pieces of evidence that could be found in or near the dark igneous layer at **X** to establish that it was a sill, and not a buried lava flow. **(2 marks)**

Evidence 1: \_\_\_\_\_

\_\_\_\_\_

Evidence 2: \_\_\_\_\_

\_\_\_\_\_

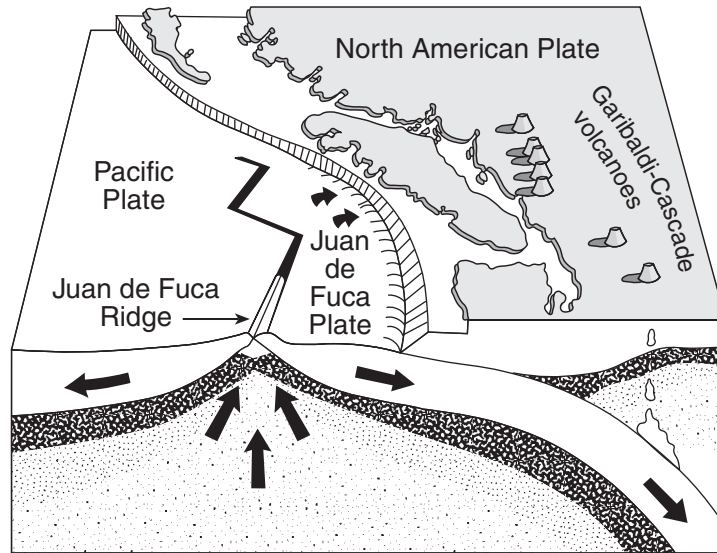
## KEY

Any two for 1 mark each:

- inclusions on top and bottom of feature in a sill, but only on bottom of lava flow
- no sign of weathering on top of feature in a sill
- contact metamorphism of country rock above and below feature
- a sill would have a lack of vesicles
- a sill would have a lack of pahoehoe and aa textures



Use the following block diagram of the southwest coast of BC to answer question 15.



15. The subduction zone that lies under BC's coast created the Garibaldi-Cascade volcanic chain.

a) Why do these volcanoes lie parallel to the subduction zone?

(1 mark)

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b) Describe **one** piece of evidence that could be found in or on the seafloor rocks that would indicate that seafloor spreading has occurred at the Juan de Fuca Ridge.

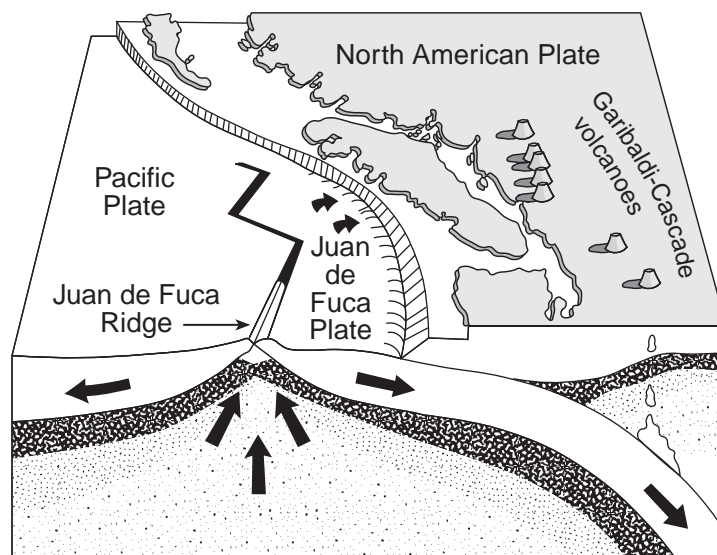
(1 mark)

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## KEY

Use the following block diagram of the southwest coast of BC to answer question 15.



15. The subduction zone that lies under BC's coast created the Garibaldi-Cascade volcanic chain.

a) Why do these volcanoes lie parallel to the subduction zone?

(1 mark)

**As the plate is subducted, it will melt at the same depth and distance from the subduction zone.**

} ← 1 mark

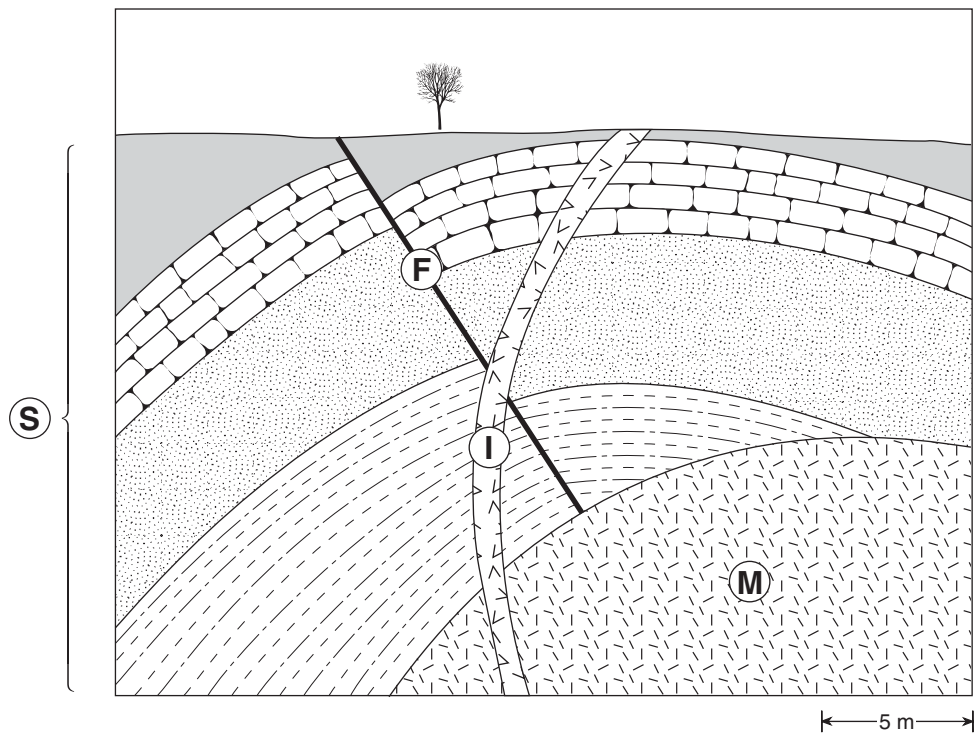
b) Describe **one** piece of evidence that could be found in or on the seafloor rocks that would indicate that seafloor spreading has occurred at the Juan de Fuca Ridge.

(1 mark)

Any **one** for 1 mark:

- **The age of the rocks becomes progressively older further from the ridge.**
- **Symmetrical magnetic stripes on either side of the ridge.**
- **High heat flow at or near the ridge.**
- **Thickness of sediments increase further away from the spreading ridge.**

Use the following geologic cross section to answer question 16.



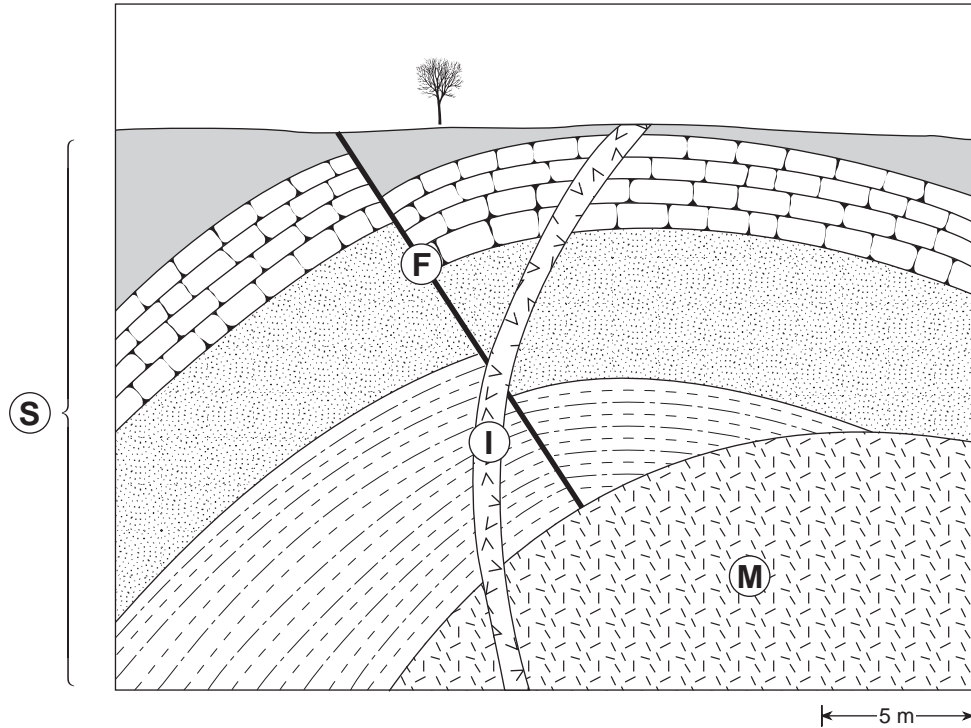
Geologic event (arranged in random order)	Cross section symbol
Faulting	F
Igneous intrusion	I
Mafic intrusion	M
Deposition of sedimentary unit	S

16. In the table below, place these geologic events in the order they occurred, with the oldest at the bottom and the youngest at the top. (2 marks)

Youngest
Oldest

## KEY

Use the following geologic cross section to answer question 16.



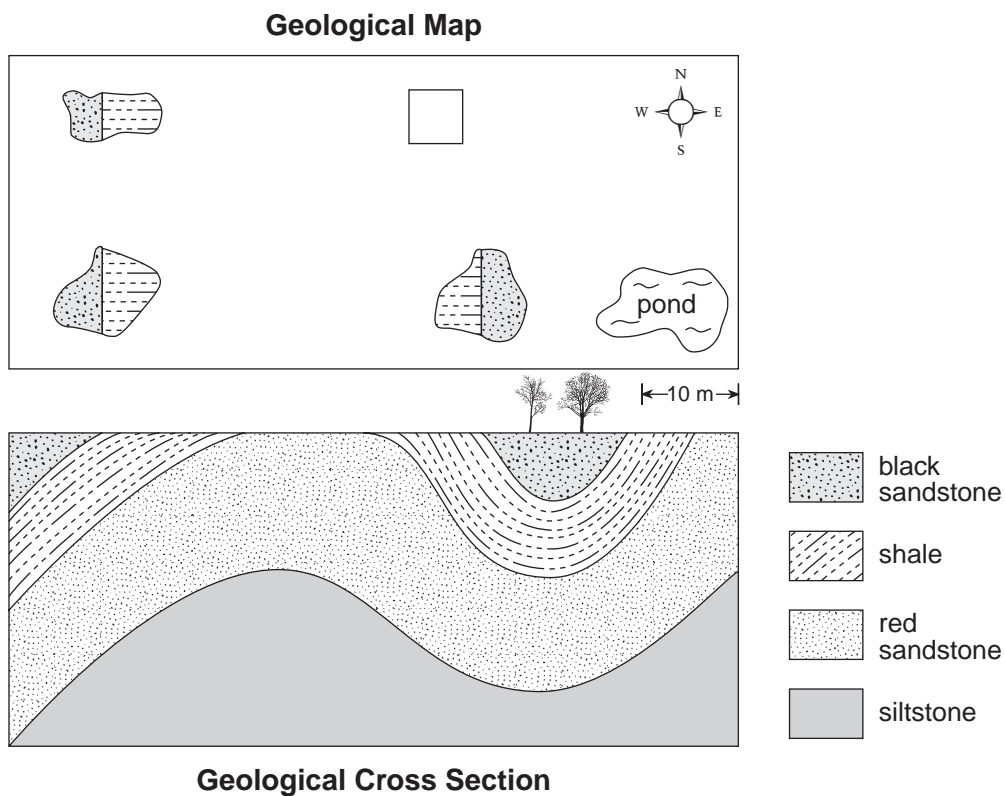
Geologic event (arranged in random order)	Cross section symbol
Faulting	F
Igneous intrusion	I
Mafic intrusion	M
Deposition of sedimentary unit	S

16. In the table below, place these geologic events in the order they occurred, with the oldest at the bottom and the youngest at the top. **(2 marks)**

$\frac{1}{2}$  mark for each correct geological event.

Youngest
<b>I – Igneous intrusion</b>
<b>M – Mafic intrusion</b>
<b>F – Faulting</b>
<b>S – Folding of sedimentary unit</b>
Oldest

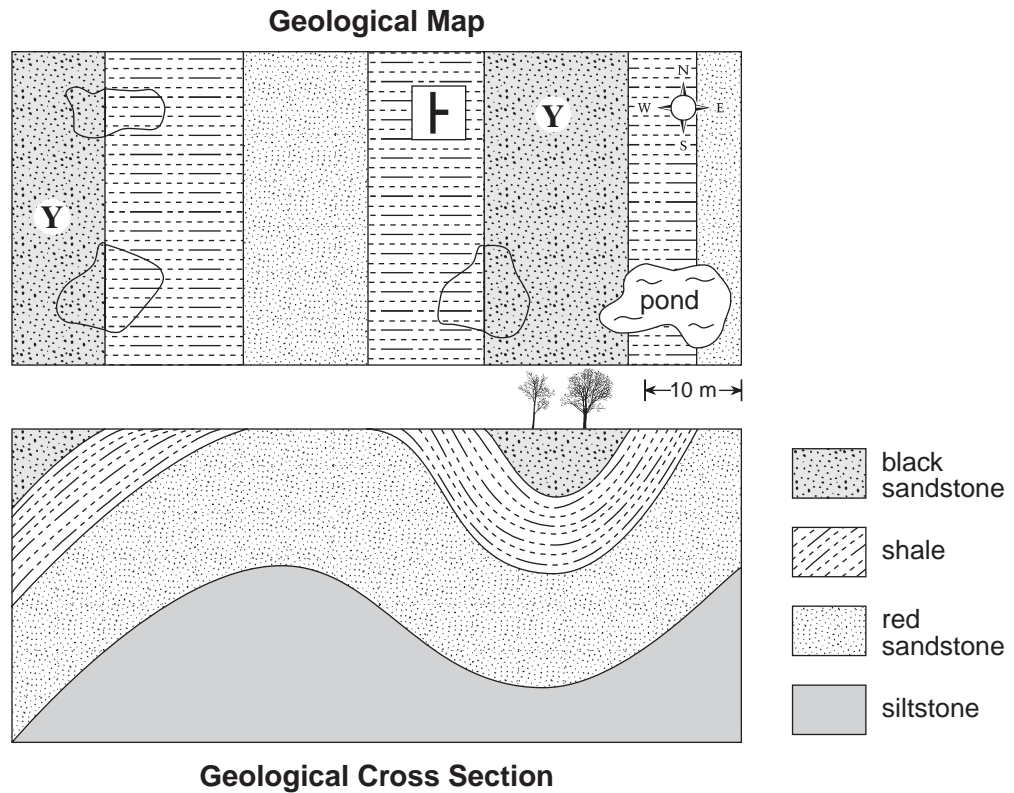
Use the following partial map and completed cross section of sedimentary rock layers to answer question 17.



17. a) Using information from the cross section, complete the geological map. **(2 marks)**
- b) Place the correct strike and dip symbol in the box shown on the geological map. **(1 mark)**
- c) Place a **Y** on the youngest rock unit of the geological map. **(1 mark)**

# KEY

Use the following partial map and completed cross section of sedimentary rock layers to answer question 17.



17. a) Using information from the cross section, complete the geological map.

**(2 marks)**

**See geological map above.**

**Mark breakdown:**  $\frac{1}{2}$  mark for accurate contacts

$\frac{1}{2}$  mark for layer labelling

**1 mark** for basic straight lines in approximately the right place

b) Place the correct strike and dip symbol in the box shown on the geological map.

**(1 mark)**

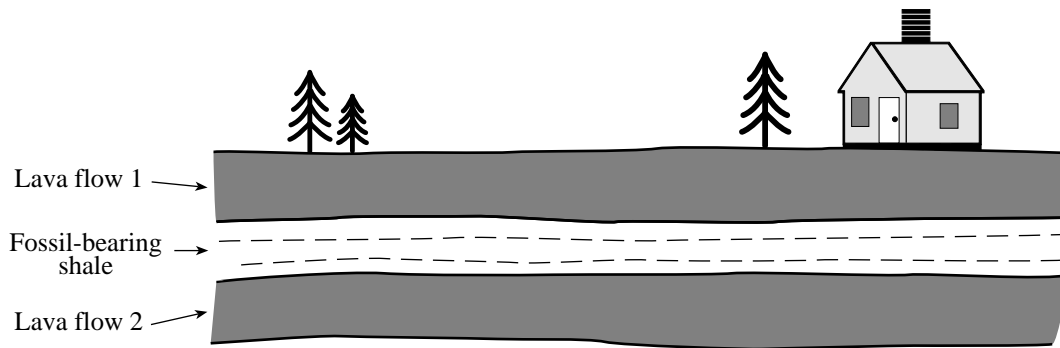
**1 mark for a correct placement of the strike and dip symbol.**

c) Place a **Y** on the youngest rock unit of the geological map.

**(1 mark)**

**1 mark for a correct placement of Y.**

18. A fossil-bearing shale is found between two old lava flows, as shown in the diagram below.



Describe **two** general methods of determining the age of the fossil-bearing shale.  
(2 marks)

Method 1: \_\_\_\_\_  
\_\_\_\_\_

Method 2: \_\_\_\_\_  
\_\_\_\_\_

19. The Burgess Shale of Yoho National Park, B.C. is well known for the fine detail and the preservation of traces of soft parts in its fossils. List **two** factors that would lead to the occurrence of this type of preservation and for each explain how the factor promotes fossilization.  
(3 marks)

Factor 1: \_\_\_\_\_

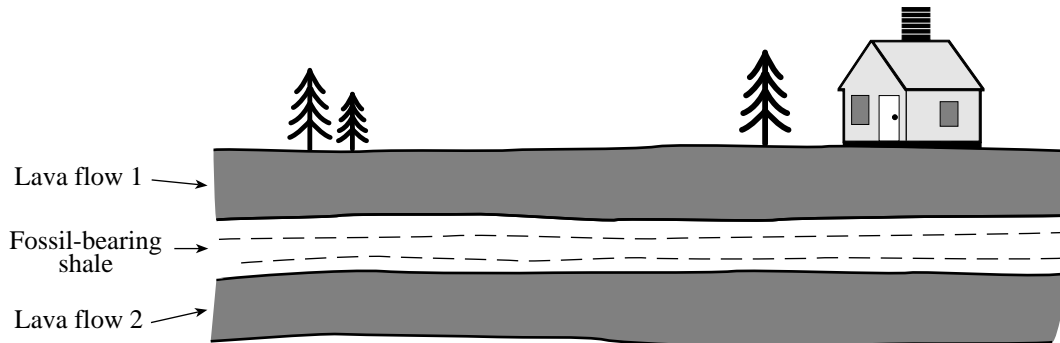
Explanation: \_\_\_\_\_

Factor 2: \_\_\_\_\_

Explanation: \_\_\_\_\_

## KEY

18. A fossil-bearing shale is found between two old lava flows, as shown in the diagram below.



Describe **two** general methods of determining the age of the fossil-bearing shale. (2 marks)

**For example:**

**Answer should refer to the use of index fossils in the shale (as one method), and to the dating of the lava flows radiometrically (as the other method).**

**Relative dating from index fossils and superposition. (1 mark)**

**Bracket age of shale with radiometric date of lava. (1 mark)**

**Fossils (only word used). ( $\frac{1}{2}$  mark)**

19. The Burgess Shale of Yoho National Park, B.C. is well known for the fine detail and the preservation of traces of soft parts in its fossils. List **two** factors that would lead to the occurrence of this type of preservation and for each explain how the factor promotes fossilization. (3 marks)

Factor 1: **Rapid burial.**  $\leftarrow \frac{1}{2}$  mark

Explanation: **Prevents scavenging.**  $\leftarrow 1$  mark

Factor 2: **Exclusion of oxygen.**  $\leftarrow \frac{1}{2}$  mark

Explanation: **Prevents decomposition.**  $\leftarrow 1$  mark

Other: **Fine sediment.**

Explanation: **Allows for preservation of fine details.**